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Examiners' Report

June 2017

Pearson Edexcel Functional Skills Mathematics Level 2 (FSM02)

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Introduction

The majority of learners attempted all questions in the paper, though with varied rates of success. While some produced thoughtful and thorough responses, there were several questions left blank (mostly towards the end of the paper) which would suggest that some learners had clear gaps in their knowledge or were not mindful of the time limitation and spent too much time on some questions. The most evident issue at this level was that far too many learners were using inefficient build-up methods (in working out percentage or when dealing with ratio questions) which often led to inaccurate answers. Centres should encourage learners to use the most efficient methods to assure accuracy and save time. With calculators being available to the learners, it is difficult to justify the use of inefficient build-up methods.

The majority of learners presented their working throughout each question but there were a few instances where the calculations were not clearly organised or simply missing. Marks are awarded for processes so it is paramount that all calculations are shown. Learners should be encouraged to present all their calculations, however simple, and do so in an organised and logical order. It is also critical that learners state their decision clearly (Yes or No usually suffices) as at least one mark in every question is awarded for correct conclusion accompanied by accurate figures. Accurate figures also require showing the units they are working with, i.e. cm, £, minutes etc. It was especially clear in this paper that many learners could not convert between units or disregarded them and arrived at incorrect conclusions. The concept of speed stood out as the most challenging, and while some learners could recall the distance-speed-time equation triangle, they were unable to use it correctly. Converting time from decimal notation into hours and minutes also proved rather challenging to many learners.

Centres should encourage learners to read each question in detail and skimming should be avoided. A good tactic is to underline the salient points in the question, and learners should keep checking to see if they have missed something out, or have misread the question. Centres need to remind learners to check that their answer is sensible, especially in the multi-step questions, as there were some instances where learners misinterpreted the results of their calculations and their final answer was incorrect. Learners should be encouraged to carefully consider the context, practise extracting essential information and focus on what the demand asks for when making their final decision. Many learners failed to gain the checking mark as they either repeated the calculations they had already presented or did not show any check at all.

There are a few areas that the learners should particularly improve on. These include converting between units, especially of time as many incorrectly used decimals in their calculations, using speed and other common compound units, engaging with scale and using rounding appropriately – some learners unnecessarily do so in the intermediate stages of their process which leads to inaccurate final decision.

Section A

Question 1a

This question was poorly answered and very few learners have scored full marks. They were unable to work out the time it would take for the parade to arrive at the park. For the minority of learners who were able to recall the distance–speed–time equation and apply it correctly, it proved rather challenging to convert their fraction or decimal of an hour to minutes. Very few learners realised that 0.4 hours is 24 minutes. Very often they believed it was equivalent of 4 or 40 minutes, when all they had to do was to multiply the decimal by 60. It is important that the centres teach the learners to remember that almost uniquely for units dealing with hours, minutes and seconds does not involve dealing with multiples of ten.

Some learners attempted to use proportion in answering this question, which is effective, if not a little long-winded, e.g. 3 km per hour is the same as 3 km in 60 minutes (1hr = 60 minutes) is the same as 1 km in 20 minutes (dividing by 3) is the same as 0.2 km in 4 minutes (dividing by 5) is the same as 1.2 km in 24 minutes (adding). Learners would benefit from more practice with problems involving speed, distance and time and converting units of time effectively.

Question 1b

Most learners could provide a reasonable explanation for something that could affect the arrival time at the park, e.g. traffic/congestion. The majority have scored full marks on this question. This is very encouraging to see that learners can evaluate a real-life situation and deliver relevant interpretation.

Question 1c

This question tested ability to work out the area of a compound shape and deal with compound unit of visitors per m^2. Having established the question is about area and not perimeter learners need to be careful to keep track of what units they are subsequently calculating. Almost all learners who did not add the lengths together got to an area of $10300m^2$. This is reassuring but still too many learners at this level worked with perimeter. The last step of the calculation that would lead to finding figures to compare proved more of a challenge as some learners lost track which units they needed to work in and multiplied or divided seemingly random figures. Centres should practise dealing with compound units and checking if calculations make sense in the given scenario.

Question 1d

Most learners attempted this question and were able to correctly work out three fifths of £8.50 and present their answer in correct money notation. Those learners who did not gain full marks did so because they failed to write the answer in the correct money notation or found two fifths of the figure (misinterpretation of the question).

Question 2

The majority of learners were able to attempt this question, most were able to gain full marks and could correctly work out the cheapest option. Learners who failed to gain all marks on this question did so because they were unable to work out 18% of a given figure. These learners would benefit from more problem-solving questions involving percentages and encouraged to use calculator (i.e. 18÷100×19.20) rather the inefficient build-up method. For those less numerate the unitary method is easier than the build-up method which many learners struggled with here. Many learners showed 3 × £6.40 = £19.20. Then using 1% of £19.20= £19.20÷100 and 18% of £19.20= £19.20÷100 × 18 which is easier than finding 10%, 5%, 1% and hence 18% unless the student had no calculator.

Section B

Question 3a

Although several learners answered this question well, many were let down by not understanding what to do with the fraction. Others were let down too by not picking up that the cost of £10.50 was per student and not an overall cost. Several learners correctly found the total entry cost for 37 learners (37 x £10.50) but then also incorrectly added another entry fee. For example, the fee for half a day at court (37 x £8.50). A few learners carried out the correct calculation but then did not gain the final mark as they stated 'yes' rather than 'no'. Learners must practice selecting the required information when they are presented with a lot of information. Highlighting key data helps.

The most common reason for learners not gaining full marks were the following:
many failed to correctly identify the need to find 1/8 of £500, often working of this fraction of another value; many misinterpreted the costs and added £10.50 to £350 rather than finding 10.5 x 37 first and then adding it to the £350 or found 17 x 37 = £629 correctly only to incorrectly subtract £350 from this value.

Centres should practice multi-stage real-life costing scenarios (cost trips to a variety of destinations with discounts built in or holidays with term time discounts) to improve on reading comprehension skills and setting structure to dealing with complex calculations.

Question 3b

This question asked for a time plan. In order to be successful in this type of question each stage of the plan needs to be named and have the start and the end time. Although some learners worked out all the times correctly, they did not write down what was happening at each stage, thereby creating an ineffective time-plan. A few plans had the coach leaving court before 3.10, thereby arriving back at college early. Other common errors included incorrect time conversion (when changing the fraction of time to a decimal they forgot to multiply by 60), errors in adding time and incorrectly allocating 2 hours for lunch rather than 45 minutes.

Practice in writing time plans where there are multiple time constraints would be helpful. Learners need to be able to work with time in fractions of an hour as well as hours and minutes.

Question 4a

It was reassuring to see so many fully correct answers to this question and many included a valid check. Most learners achieved the first mark for finding the total and dividing by 6, although not all of them calculated the correct mean. Some learners divided by 7 or 5 instead of 6 and some worked with median. Several learners did not complete a check at all or simply repeated their previous calculation. Tutors cannot stress enough the importance of including checks as there too many scripts with blank boxes. Some learners found the correct mean but did not make a statement which in this case could have been 'yes' or 'no'.

Question 4b

Most learners did not gain full marks for this question with several not attempting it at all. Many of the learners failed to understand the process of representing a value as a percentage of another value (the common mistake was 19160 ÷ 3097 instead of 3097 ÷ 19160). It would be beneficial if centres practised this skill in real life scenarios.

For example, a survey of 200 people was carried out. 40 people rated the service as excellent. What percentage of people rated the service as excellent? And explain that if they divide number of excellent responses by the total number of people and multiply the answer by 100 they will get the percentage. 40 / 200 = 0.2 x 100 = 20%. Some learners found the correct % but did not round to 1d.p. Centres need to practise this skill, which is not challenging arithmetically.

Section C

Question 5

Overall this question was answered well by many learners. It required learners to substitute numbers into a formula, to convert from millimetres to metres and to compare their answer with a particular length of wood. They were meant to interpret 2(1130 + 580) as 2 x (1130 + 580) and '4a' as '4 x a' = 4 x 420. Some did not use the formula and just worked from the diagram. When evaluating formulae with brackets centres need to stress that all the contents of the bracket are multiplied by the value outside the bracket. Ideally, in this instance add the values of b and c first and then double the answer. Unit conversion was generally good but still there was some confusion between mm and m. There were instances of not knowing that 1000 mm is 1 m. Tip to help remember is "when milli involved the number is 1000", "when centi involved it's 100". Make sure decimal points are clearly written when needed. For the final decision in the answer, always re-read the question so you do not get it the wrong way round. Many answers said there was enough wood because 5.1m was bigger than 4.8m. Centres should be encouraged to practice formula substitution & unit conversion.

Suggestion to centres – teach the learners to write the whole formula out and place brackets around individual terms (letters).

$$L = 2(b + c) + 4a$$

$a = 420\,mm$

$b = 1130\,mm$

$c = 580\,mm$

L = 2((b) + (c)) + 4(a).

It looks complicated but practise will ensure it works. Now rewrite but substitute the terms (letters) with the correct values.

L = 2((1130) + (580)) + 4(420).

The learners are then taught to type this into their scientific calculator and the solution presents itself. Many people have basic excel spreadsheets skills, which utilise formulae in this style, either by using numbers or cell identification, so they should be more familiar with this.

Question 6a

This question tested the skill of interpreting the scale and reading off a graph. Learners needed to realise that 1 square of 2 mm was worth 2 sq ft horizontally and 0.2 sq m vertically. There were quite a lot of errors and so centres should advise pupils to decide (and write down) what each small square means on each axis before they start to use the graph – it is very often down to short division which on a calculator paper should not pose any problems. Always use a ruler to draw required lines on graph paper to ensure staying on the correct line of the grid. One answer read off 100 sq ft = 9 sq m and then calculated (correctly) the value for 82sqft. An amazing amount of answers stated 74sqm instead of 7.4sq m. Simple checking of the graph's vertical axis which only went up to 10sqm would have shown the necessity for a decimal point.

Question 6b

This was a very well answered question including the check. Many learners remembered the method for sharing in a ratio. Centres need to make sure that the principles of ratio are understood as too many learners simply divided 1.6 litres by 4, then 3 then 1 to get an answer. Centres need to encourage their pupils to visualise the context of the question to stop giving answers of 8,6 and 2 litres when only 1.6 litres are needed in total.

The bar method is being used in secondary schools more and more so dividing the total by number of part and practising dividing a quantity by parts with short division and calculator as a check to confirm correct entry could benefit the learners. Checks should be part of every preparation for Functional Maths Level 2. Learners should practise writing out alternate questions based on a starter question to learn understanding of inverses and number position and learners taught the commutative properties of multiplication and addition, and that this does not apply to division and subtraction.

Question 7a

This question tested ability to interpret the scale and engage with placement constraints. Of those who attempted this question, there were only a few who obtained a rectangle 3 cm wide and 2.5 cm high. There was little evidence of understanding the need to multiply e.g., 1.2 by 100 and divide by 40, thus converting metres to centimetres using the scale correctly. In order to prepare learners, there should be a variety of tasks including looking at scales on maps & converting measurements to real life situations & vice-versa. There are a lot of constraints in this question, so a good approach would be to begin by sectioning off the areas the pictures must not be hung in. Next decide on picture size using the scale - 1:40 means each 1 cm (or square on the grid)=40cm, so work out 120/40 and 100/40 for number of squares needed. Put first 'picture' as high as allowed then next a bit lower and so on making sure they are at least 1 sq apart horizontally. It is important to make sure the three rectangles are all the same size & orientation as each other. Some very good answers were seen, but too many learners simply did not read the question and did not apply some, or often any of, the constraints necessary to give a correct answer.

Question 7b

This straightforward question has a high success rate. Many learners presented correct process and interpreted their final figures correctly. The most common error was that of misunderstanding their answers due to not including units or using the wrong currency. Most did 490x1.23=602.7 but inserted £ sign with 602.7 and stated ‘yes’. Inserting correct units throughout calculation should make understanding easier.